

CONFERENCES

→ IMPERIAL AGRICULTURAL RESEARCH
CONFERENCE, 1927.

FACILITIES FOR ADVANCED STUDY AND RESEARCH

IN

AGRICULTURAL SCIENCE

AND

COGNATE PURE SCIENCES

IN THE

IRISH FREE STATE.



saorstat éireann

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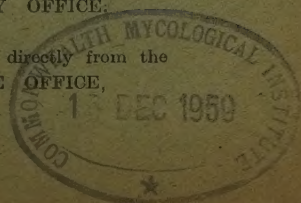
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UNIVERSITY COLLEGE, DUBLIN.

FACULTY OF AGRICULTURE.

The Faculty of General Agriculture in University College, Dublin, which is a Constituent College of the National University of Ireland, was established in 1926, and the University Courses in the Faculty given in the College form the curriculum for the Degrees of B.Agr.Sc., and M.Agr.Sc., of the University.

The work of the Faculty in teaching and research is carried on at the Albert Agricultural College, Ballymun Road, Glasnevin, Dublin, which is situated about three miles N.E. from the General Post Office, Dublin. Nearest Tram Service—Glasnevin Terminus (about one mile). Telephone—Drumcondra 64.

The buildings of the College have recently been extended and re-organised and extensive laboratory accommodation, land and equipment are now provided for study and research in the following departments :—General Agriculture, Animal Nutrition, Plant Pathology, Plant Breeding, Soil Science, Agricultural Botany and Bacteriology, Agricultural Zoology, and Horticulture.

The following is a brief account of these departments :—

Dean of the Faculty and Director of the Institute and Farms :—

Prof. J. P. Drew, M.Sc., A.R.C.Sc.I.

DEPARTMENT OF GENERAL AGRICULTURE.

STAFF.

Director ... Prof. J. P. Drew, M.Sc., A.R.C.Sc.I.

Assistants :— F. Hussey, B.Agr.Sc., A.R.C.Sc.I.

D. Deasy, B.Agr.Sc.

F. O'Connell.

This department deals with Crop Husbandry and Animal Husbandry. It has the management of a farm of 350 acres of arable land with modern farm buildings and machinery.

The department is equipped for large scale experiments on problems directly concerning farm management. Most of the investigations are arranged in collaboration with one or more of the other departments of the faculty.

SUMMARY OF WORK.

The work that has been undertaken and that which is now in progress may be summarized as follows :—

Intensive Management of Pastures.—This experiment, now in its fourth year, was arranged to investigate the effects of heavy dressings of nitrogen to grass land under a system of rotational grazing. The advantages of rotational grazing are also being independently investigated. Thirty statute acres of permanent pasture divided into plots are made use of for the purpose of the experiment. Cattle and sheep are utilized for the grazing of the plots and the results are measured in terms of liveweight increase and stock carrying capacity per statute acre.

Investigations concerning the effects of the above management on the botanical and chemical composition of the pasture flora are also being conducted as well as its effect on the soil.

Silage.—An investigation on the production and feeding value of grass silage was carried out over a period of two years. The results obtained indicate that pasture grass may be suitably conserved by ensiling and that the silage produced may be used with advantage to replace hay, roots, and a portion of the concentrated foods in the feeding of farm live stock. A full report of this investigation was published in the Journal of the Department of Agriculture.

A preliminary investigation on the ensiling of chaffed and unchaffed pasture grass in an inexpensive concrete pit silo was carried out with encouraging results and the subject is being further investigated.

An investigation on the intensive manuring of grass land for the production of grass silage which was started in 1929 is also being continued.

The Feeding Value of Wheat for Farm Livestock.—The relative feeding value of imported and artificially prepared foods to that of home-grown grain is a problem which has received considerable attention. The results obtained from numerous feeding trials would indicate that barley and oats may be used with advantage to replace some, at least, of the imported or artificially prepared foodstuffs, in rations for calves, fattening cattle and pigs. In the case of wheat, however, very little is known of its comparative feeding value for livestock and farmers are, therefore, reluctant to grow it specially for that purpose. In order to obtain information on this question a number of feeding trials were carried out with the following results :—

(a) For calves and fattening cattle wheat and oats were found to be of about equal feeding value.

(b) For milk production six parts of wheat were equal in feeding value to a mixture of four parts of oats and two parts of bran.

(c) In the rearing and fattening of pigs six parts of wheat had a much higher feeding value than a mixture of four parts of pollard and two parts of bran. The average price of the latter mixture in 1929 was £11 13s. 4d. per ton, whereas Irish farmers sold their wheat at about an average of £10 per ton.

A full report of these feeding trials was recently published in the Journal of the Department of Agriculture.

FACILITIES FOR STUDY AND RESEARCH.

The institute and farms are well equipped and a certain amount of material is nearly always available, and arrangements could be made for dealing with special subjects in which visiting workers may be interested.

ANIMAL NUTRITION DEPARTMENT.

STAFF.

Head of Department ... E. J. Sheehy, B.Sc., F.R.C.Sc.I.

Assistant ... B. J. Senior, B.Sc.

SUMMARY OF WORK.

1. *Mineral Requirements of Pigs and Calves, and the Factors which aid Mineral Assimilation in these Animals.*

(a) By balance and group experiments the necessary mineral supplements to the food of the pig have been determined and the comparative antiraehitic potency of sunlight and certain samples of cod liver oil determined; and a comprehensive report of the work is in press: the effect of oil, *per se*, is under investigation.

(b) The utility of mineral supplements in the case of calves is being investigated: simultaneously other factors concerning calf nutrition, *e.g.*, scour produced by injudicious feeding and the comparative value of floury and flaky meals, are being examined.

2. *Effect of Food on Milk Fat.*—A systematic study of the effect of feeding on the percentage and total fat in the milk of the cow is in progress: the influence of the various fats found in the cakes usually fed to cattle has been determined: incidentally the effect of cod liver oil on the secretion of minerals in the milk has been investigated and reported on.

3. *The Optimum Concentration of Mash for Growing Poultry.*—Experiments are in progress to determine the proportions of bulky and concentrated meals which give best results in the case of the young chick, fattening cockerel, and growing pullets; adequate supplies of minerals, proteins and vitamins are provided in all experimental diets; a preliminary report was read before the World's Poultry Congress, 1930.

4. *The Effect of the Method of Curing on the Quality of Hay.*—Work has just begun on this subject, and by investigating the effect of washing, aeration, etc., on the composition and digestibility of hay, the conditions which favour the conservation of the greatest amount of nutriment therein are sought.

5. *Correlation of the Carrying Capacity of Pastures with some Factors of Composition or Production.*—Some earlier investigation on the nutritive value of pasture herbage has been reported, and arrangements are being made to continue the line of study in the near future.

FACILITIES FOR STUDY AND RESEARCH.

In addition to a fully equipped laboratory for biochemical work the facilities provided for Research and advanced study include a double chamber for metabolism experiments (collection of urine and faeces separately) adjustable to accommodate pigs, sheep or cattle, as well as housing accommodation for six groups of pigs or calves, a byre fitted to hold fourteen cattle, and a food store with ample space for the preparation of feed mixtures. Pasturage on the College farm is also available for experimental work, and an arrangement provides facilities in the Poultry Section for nutrition experiments.

DEPARTMENT OF PLANT PATHOLOGY.

STAFF.

<i>Head of Department</i>	Prof. Paul A. Murphy, Sc.D.
<i>Lecturer</i> ...	... R. McKay, A.R.C.Sc.I.
<i>Assistant</i> ...	... Miss P. Clinch, Ph.D.
<i>Assistant (Entomology)</i>	J. B. Loughnane, B.Agr.Sc.
<i>Assistant</i> ...	... W. Hughes, B.Agr.Sc.

AIMS OF THE DEPARTMENT.

The work of the Department comprises the investigation of the cause and control of diseases of plants due to the action of environment, fungi, bacteria, and viruses. Although the staff includes an entomologist, injuries caused by insects alone are not included in the scope of the work, but insect-borne diseases are.

Special attention is given to study of the control of parasitic diseases. Pathological investigation is frequently confined to determining the identity of the parasite, leaving untouched the question of control, either from want of facilities for the purpose, or lack of knowledge of the problems to be solved. The systematic study of control measures demands, in addition to knowledge of the characters of the parasite and the host, careful observation of the inter-relationships of both organisms, both

in the laboratory and under normal cultural conditions. The Department is favourably situated for carrying on work of this sort, being situated on a large and well-equipped farm, with unusual facilities for field work.

The Department of Plant Pathology of the College acts as advisor in phytopathological matters to the Department of Agriculture, and in this capacity examines much material from all parts of the country. A record of the occurrence and distribution of all native plant diseases is maintained.

SUMMARY OF WORK.

Principal attention has been devoted to diseases of the potato, but the investigation of diseases of other crops is receiving increasing prominence.

(1) *Potato Diseases*.—Following an extensive study of the bacterial and fungus diseases of this crop initiated by the Department of Agriculture, the virus diseases of the potato have had particular attention paid to them during recent years. It has been shown that "mosaic" consists of several separate entities, and that the reaction of varieties of the potato to each of these diseases varies. Some varieties are "carriers" of certain mosaic diseases. It is necessary, therefore, in virus investigation to work with proved virus-free plants, and methods for testing plants for the absence of virus infection have been evolved which have been widely adopted elsewhere. The reaction of a variety to mosaic diseases is a factor determining the useful life which that variety will enjoy, the corollary of which is that the length of time new varieties are capable of surviving can now be estimated. The pathological changes induced in the potato plant by the various mosaic diseases are now the subject of study.

The principal insect vectors of leaf-roll have been determined, and the rate at which the virus propagates itself in the plant under various conditions has been established by original methods. Many other conclusions concerning leaf-roll and mosaic must be passed over. The principal results have been published in nine scientific papers.

A feature of the work on virus diseases has been the economic use which has been made of it by the Department of Agriculture in fostering the growing of seed potatoes. The Department of Plant Pathology co-operates with the Department of Agriculture in the production of healthy commercial stocks of potatoes and in the work of seed-potato certification.

Experiments having for their object the control of potato blight (*Phytophthora infestans*) by means of the application of sprays and dusts have been conducted for a number of years on the College farm.

(2) *Dry Rot of Swede Turnips caused by Phoma Lingam*.—An extensive study of this disease (which is of major economic importance) and of the parasite which causes it has been undertaken. Knowledge has been contributed to the morphology

and systematic position of the fungus, and the infection in the field has been found to arise from two sources—namely, infected seed and the remains of a previous diseased crop. Work is still being pursued actively on this and other practical aspects of the disease by means of field and laboratory experiments. The results already secured have been published in two scientific papers.

(3) *Onion Mildew caused by Peronospora Schleideni*.—Following investigations in which it was shown that this fungus commonly hibernates vegetatively in various sorts of onion bulbs, the usual sources from which infections originate in the open have been the subject of prolonged study. Under conditions in which mildew devastates the crop in most years, it has been found possible to grow onions which remain free from infection until towards the close of the season. The results of these investigations have been published in three scientific papers, and a further communication is now about to be prepared.

(4) *Stem Rust of Oats caused by Puccinia Graminis Avenae*.—This disease, which is a serious one in restricted areas of the country, is now being studied. The principal objects in view are (1) to endeavour to co-relate outbreaks of stem rust on oats with the local occurrence of the common barberry (*Berberis vulgaris*); (2) to determine which species and varieties of barberry can act as hosts of the rust; and (3) to determine which biologic forms of the rust are present, and to discover the reaction of a number of varieties of oats to them.

(5) *Various Diseases*.—The maladies of various crops, trees and ornamental plants are the subject of investigation from time to time. Recent examples include the control of seed-borne diseases of barley and flax by means of dusts and liquid disinfectants, the control of American gooseberry mildew (*Sphaerotheca mors-urae*) by means of spraying (all in co-operation with the Department of Agriculture), the control of apple scab (*Venturia inaequalis*) by means of spraying, and that of celery leaf-spot (*Septoria Apii*) by means of dusts and liquid sprays.

FACILITIES FOR ADVANCED STUDY AND RESEARCH.

Excellent facilities are provided for investigating the causes and control of parasitic diseases of plants, including those of virus origin. New laboratories, specially designed for the purpose, are now in use with accommodation for about eight workers, excluding undergraduate students. The equipment is up-to-date, and includes a room with temperature-control, refrigerator, etc. Insect-proof greenhouses are available for work under glass, and there are ample facilities for field experiments.

A useful library of works relating to phytopathology is available in the College, while other libraries in the City of Dublin provide exceptional facilities for access to publications in practically all the fields of science. A card index is available to show the distribution of scientific periodicals in all the City libraries.

PLANT BREEDING DEPARTMENT.

STAFF.

Head of Department M. Caffrey, A.R.C.Sc.I.
Assistant ... P. T. Carroll, B.Agr.Sc.

The Department has as its main object the production, by methods of scientific plant breeding, of improved varieties of the farm crops usually grown in the Irish Free State. Experimental work is, for the present, confined to the cereals—oats, wheat and barley—and grasses, but other crops will be dealt with in due course when circumstances permit. The general plan of improvement, in the case of each of the crops dealt with, is (a) to select the best strains of those varieties best adapted for cultivation, special attention being paid to old native varieties, and (b) to make crossings between certain of the strains so selected so as to obtain new forms having desirable characters in a greater degree than is possessed by any of the parental strains.

SUMMARY OF WORK.

(1) *Oats*.—The main problem dealt with is the production of prolific forms possessing straw sufficiently strong to resist lodging on heavy land. A distinct new variety Glasnevin Sonas which has been bred on the College farm, has proved to be very prolific and to possess very strong straw. This variety has been crossed with Record, Victory 2, Mansholts III., and Marvellous, and strong strawed forms derived therefrom are now under test.

(2) *Wheat*.—The Department is concerned with the production of prolific spring varieties. Many selections of April Red, which appears to be the most suitable variety at present on the market, are being propagated and crossings between April Red and prolific winter varieties including Yeoman 2 have been made.

(3) *Barley*.—As in the case of oats, efforts are being made to produce stronger strawed varieties than those at present in cultivation. The best varieties from Great Britain, Scandinavia, United States of America, and Canada have been obtained and are under test. Crossings between some of these forms and Spratt-Archer 37/6—which is the strongest strawed Irish variety—have been made. It is proposed in these investigations that only those forms which possess good malting quality as well as strength of straw will be propagated.

(4) *Grasses*.—The work in progress aims at the production of superior (a) pasture strains and (b) hay strains of perennial ryegrass and cocksfoot grass, and includes productivity trials with a large number of commercial varieties from various countries. In addition a large number of single plants of the species mentioned which have been obtained from old pasture lands and from

the progeny of commercial seed are being grown under conditions of wide spacing in order to isolate plants suitable for the formation of new strains.

FACILITIES FOR STUDY AND RESEARCH.

The facilities and equipment provided for the Plant Breeding Department comprise two bird-proof cages for the propagation of pure line cultivations of cereals and grasses, and for the carrying out of small scale "chess board" variety experiments, storage accommodation for the unthreshed and threshed produce of experimental plots, and modern threshing, screening and dressing machinery. The large scale trials and propagations are carried out on the College farm where they are arranged to fit into the ordinary rotation of crops.

SOIL SCIENCE DEPARTMENT.

STAFF.

Head of Department P. H. Gallagher, D.Sc.

Assistant Vacant

In addition to co-operating with the Department of General Agriculture in the investigation of pasture problems this Department has also been devoting attention to general soil problems.

SUMMARY OF WORK.

Soils.—Investigations have been carried out on the growth of sugar-beet on a large variety of soils. Definite relations have been established between the prevalence of some diseases of the beet and mangel crops and soil reaction. This investigation is being extended to other crops, the ultimate purpose being to determine the relation between the lime status of the soil and fertility.

FACILITIES FOR STUDY AND RESEARCH.

It is proposed to develop the equipment and facilities for soil research in the immediate future.

AGRICULTURAL BOTANY AND AGRICULTURAL
BACTERIOLOGY DEPARTMENT.

STAFF.

Head of Department M. J. Gorman, A.R.C.Sc.I.

Assistant ... D. Slattery, B.Sc., A.R.C.Sc.I.,
N.D.A.

SUMMARY OF WORK.

Grassland problems, especially those concerned with the seeding and management of land for hay and pasture, are being investigated, large field plots being used for the purpose.

FACILITIES FOR STUDY AND RESEARCH.

The accommodation comprises a well-equipped general laboratory, lecturer's room and preparation room and a conveniently situated greenhouse adapted to the needs of the department. Field and garden plots for experimental work are also available.

AGRICULTURAL ZOOLOGY DEPARTMENT.

STAFF.

Head of Department J. Carroll, M.Sc., D.I.C., .A.R.C.Sc.I.,
N.D.A.

Assistant T. Turpin, B.Agr.Sc.

The Department of Agricultural Zoology is not yet fully staffed and its equipment is still incomplete. A well-equipped laboratory has recently been completed and it is proposed to erect in the near future insect-breeding cages where some of the more important insect pests will be reared and kept available for experimental purposes.

SUMMARY OF WORK.

During the past two seasons a series of tests with winter sprays for the control of red mite on apple were carried out. The results of this work are summarised in two papers entitled "Tests with Winter Sprays for the Control of Red Mite on Apple" and "The Control of Red Mite on Apple by Winter Spraying" published in the Journal of the Department of Agriculture (Irish Free State) Vol. XXIX., No. 1 and Vol. XXX., No. 1.

Experiments on the treatment of cattle for the destruction of warbles are being conducted in conjunction with the Department of Agriculture.

Research on the potato eelworm (*Heterodera schachtii*) has been in progress during the past season. The investigations in connection with this pest are being conducted both in the field and by means of pot experiments.

FACILITIES FOR STUDY AND RESEARCH.

It is proposed to develop the equipment and facilities for research in the immediate future.

HORTICULTURAL DEPARTMENT.

STAFF.

Head of Department G. O. Sherrard, M.C., A.R.C.Sc.I.

The Horticultural Department comprises an orchard of four acres and three acres of vegetable ground together with suitable laboratory accommodation.

SUMMARY OF WORK.

The principal work of the Department includes:—

- (1) The testing of varieties of fruit and vegetables.
- (2) The trial in the field of the various remedies recommended for the control of the insect and fungoid pests of horticultural plants.
- (3) Selection and breeding work with the Cabbage group of vegetables with the object of improving existing varieties and raising new ones.

Fruit.—The fruit at present under trial are the apple, black currant, red currant and raspberry.

Good variety collections of the apple, black currant and red currant already exist, and one of the raspberry is in course of formation.

Other work in progress with fruit is a study of the manurial requirements of the black currant and testing of standard varieties of the apple on East Malling pedigree stocks.

Vegetables.—Particular attention is being devoted to the Cabbage group of vegetables. Breeding work is in progress with Brussels Sprouts, Savoy Cabbage, York Cabbage and Broccoli. Comparative trials are conducted each year with existing varieties of these vegetables, in the course of which their characteristics are studied.

FACILITIES FOR STUDY AND RESEARCH.

Facilities exist for research in pomology, in the genetics of fruit and vegetables, and in the manuring of garden crops. Investigations in the control of the pests and diseases of horticultural crops can be carried out in conjunction with the Departments of Agricultural Zoology and Plant Pathology.

UNIVERSITY COLLEGE, CORK.

INSTITUTE OF DAIRY SCIENCE.

The new Institute Buildings, which are in course of erection in the College grounds, will include an Experimental Dairy and Chemical, Bacteriological and Technological Laboratories. Attached to the Institute is an Experimental Farm of about 135 statute acres, situated at Bishopstown, about three miles from the Institute.

STAFF.

<i>Director</i>	...	...	C. Boyle, M.A., Ph.D., Professor of Agriculture at University College, Cork.
<i>Dairy Bacteriology</i>	...		M. Grimes, M.Sc., Ph.D.
<i>Dairy Chemistry</i>	...		G. T. Pyne, M.Sc., A.R.C.Sc.I., F.I.C., Ph.D.
<i>Dairy Technology</i>	...		J. Lyons, A.R.C.Sc.I., N.D.A., N.D.D.
<i>Dairy Engineering</i>	...		F. A. McGrath, B.E., A.M.I.E.E.
<i>Dairy Accountancy and Economics</i>	...		M. Murphy, M.A., B.Comm.

AIMS OF THE INSTITUTE.

The Institute provides facilities for the training of Managers for Creameries and Separating Stations in the Irish Free State and for the investigation of problems connected with the production and handling of milk and the manufacture of dairy products.

SUMMARY OF WORK.

Milk Production.—An abortion-free and tuberculosis-free herd of crossbred dairy shorthorn cows is being established at the College Farm. Experimental work is in progress with the object of comparing the milk yields obtained from pasture land under the intensive nitrogenous manuring system compared with

those obtained from similar land, treated according to ordinary good farming practice. Mechanical milking is being compared with hand milking in order to determine the effect on the yield and cleanliness of the milk produced.

Dairy Bacteriology.—A study is being made of the types of bacteria, lactose-fermenting yeasts and moulds encountered in the examination of milk, cream, butter and water. One of the bacterial forms isolated has been identified as a new species and named *Chromobacterium viscosum* (*Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten*, Band 72, p. 367, 1927). The relation of the Reductase (*Methylene blue*) test to the total bacterial count when milk is held at a low temperature is being studied.

Dairy Chemistry.—Investigations into the methods of restoring viscosity to pasteurised cream are being conducted in collaboration with the Department of Dairy Technology. An interim report was presented to the World's Dairy Congress, 1928. Attention is being devoted to certain more theoretical aspects of cream thickening and in this connection the mode of action of viscogen (*calcium saccharate*), hitherto unknown, has been examined and worked out. An account of this research appears in the current number of the *Journal of Agricultural Science* (July 1929).

Dairy Technology.—In addition to the work being conducted in collaboration with the Department of Dairy Chemistry, this Department is engaged on a study of the factors influencing the body and texture of butter.

Dairy Engineering.—An investigation into the possibilities of utilising electricity in commercial creameries is being planned and will be put into operation as soon as the Experimental Dairy, attached to the Institute, is completed.

. FACILITIES FOR STUDY AND RESEARCH.

Admission.—No person under the age of twenty-five, unless he is already a graduate of a University, shall be eligible to enter as a student with a view to obtaining a higher degree by research.

The duration of the course of research shall extend over at least three terms for a Master's degree and over at least six terms for a Doctor's degree.

Voluntary workers may be given permission to work in the Institute for shorter periods.

Persons wishing to avail of these opportunities should communicate with the Director of the Institute stating their qualifications and the particular problems they propose to investigate.

DEPARTMENT OF AGRICULTURE.

SEED TESTING AND ECONOMIC BOTANY DIVISION.

The Laboratories of the Seed Testing and Economic Botany Division are situated in the College of Science Buildings adjacent to the Offices of the Department of Agriculture, Merrion Street, Dublin.

The primary object of this Division is to control, as far as possible, the quality of the Agricultural Seeds used for sowing in the Irish Free State and to carry out such investigations as time permits.

STAFF.

<i>Head of Division</i>	... H. A. Lafferty, F.R.C.Sc.I., M.R.I.A.
<i>Chief Assistant</i>	... Miss L. K. S. Bermingham, B.A., A.R.C.Sc.I.

The work of this Division falls under the following heads :—

- (a) Testing of seeds submitted voluntarily by farmers and merchants.
- (b) Testing of seeds taken under the provisions of the Weeds and Agricultural Seeds (Ireland) Act, 1909.
- (c) Conducting investigations designed to improve the technique of scientific Seed Testing.
- (d) Giving advice on such matters as the identification of plants, the eradication of weeds, etc. In connection with the former a considerable amount of work has been carried out on the identification of aberrant forms of Brassicas found growing among swede crops in Ireland. Certain results have already been published and further work on a closely related problem is at present in progress.

BALLINACURRA CEREAL STATION.

The station is situated at Ballinacurra, County Cork, twelve miles from Cork and $1\frac{1}{2}$ miles from Midleton Railway Station, Great Southern Railways. Telephone—Midleton

STAFF.

<i>Officer in Charge</i>	... John H. Bennett.
<i>Assistant</i> ...	... J. C. Chaloner, M.A., Agric.B.
<i>Assistant</i> ...	... H. Hume.

The objects of the station, which is situated in an extensive cereal growing district, are :—

- (a) The propagation, by hybridisation and single plant selection, of improved strains of barley and the

distribution of stocks of pedigree seed barley to selected growers throughout the country.

- (b) The distribution of improved varieties of oats which have been raised from foundation stocks under the supervision of the staff at the Station.

The buildings attached to the Station are equipped with appliances specially designed for the threshing, cleaning, drying and storage of grain in relatively small lots. Two bird-proof propagating cages have been erected in the experimental grounds.

SUMMARY OF WORK.

(a) *Barley*.—The main object of the barley propagation work is the production of strains which combine high yield and good malting quality, with early maturity, strength of straw and resistance to disease. The now well-known Spratt Archer barley was first produced at the Station and particular attention has been devoted to the raising of improved strains of this variety. Attention is also directed to the propagation of new varieties by hybridisation and several such varieties have been produced. The experimental grounds are also utilised for testing the suitability for cultivation in the Irish Free State of any varieties of barley which in trials elsewhere have shown outstanding merit.

Varieties which show promise in chess board trials in the propagation cages and in subsequent trials on the half drill strip system are further propagated in garden and field plots. Finally they are tested in large scale plots at several centres throughout the country and the produce of these plots is submitted to malting tests. Strains which finally come up to the required standard as regards yield, malting quality, etc., are propagated under the supervision of the Station Staff and from 300 to 400 barrels of pedigree seed are distributed annually, through the Irish Maltsters' Association and other channels, to selected growers who undertake to preserve the subsequent year's produce for sale as seed barley. Messrs. A. Guinness, Son and Co., Ltd., co-operate with the Department in the breeding and testing of varieties of barley and also in the distribution of pure line seed of approved variety or strain.

Extensive experiments have been conducted on the prevention of covered smut of barley (*Ustilago hordie*) and incidentally on the prevention of stripe disease (*Helminthosporium*) by the previous treatment of the seed barley with various fungicides.

(b) *Oats*.—The production and propagation of improved varieties of oats which formerly was one of the functions of the Station is now undertaken mainly by the Plant Breeding Station of the Agricultural Faculty of University College, Dublin, at the Albert Agricultural College, Glasnevin, but in the case of some varieties which are better suited to the light soil at Ballinacurra than to the heavier soil at the Albert Agricultural College, pro-

pagation in the later stages is still conducted at Ballinacurra. Foundation stocks of such new varieties and improved strains of oats produced at the Albert Agricultural College are further propagated at Ballinacurra either on the land attached to the Station or directly under the supervision of the Station staff on adjoining farms. After treatment at the Station from 300 to 400 barrels of pedigree seed oats are distributed annually through the medium of the Agricultural Instructors to selected farmers who in turn undertake to dispose of the produce for seed purposes.

VETERINARY RESEARCH LABORATORY.

This Laboratory is situated at Thorndale, Drumcondra, about two miles north of Dublin. Nearest Tram Service—Whitehall Terminus (about twenty minutes' walk). Bus Service—Swords Bus. Nearest point "The Thatch" (ten minutes' walk). Telephone—Drumcondra 122.

Research.

STAFF.

Director ... J. H. Norris, M.R.C.V.S. (also acts as Chief Veterinary Officer).

Assistant Director ... Vacant.

Diagnosis and Vaccine Work.

No special staff. This work is carried out by Veterinary Inspectors detailed from the Department's general staff.

AIMS OF THE LABORATORY.

The Laboratory was established for accurate diagnosis and research work in connection with diseases scheduled under the Diseases of Animals Acts and other animal diseases of economic importance to Stock Owners.

SUMMARY OF WORK.

The work may be summarised under three heads :—

- (1) Diagnosis and Advisory work.
- (2) Preparation of Vaccines.
- (3) Research Work.

Diagnosis Work.

(a) All specimens connected with the Scheduled diseases in the Free State.

(b) Specimens received from Veterinary Surgeons for diagnosis.

(c) Agglutination tests for contagious abortion.

Vaccines.

Preparation of anti-abortion vaccine, preventive Braxy Vaccine, Black Quarter Vaccine and, when necessary, special Vaccines.

Research.

(a) Contagious bovine abortion—problems in connection with vaccination and immunity.

(b) Anti-tuberculous vaccination—Field and Laboratory experiments.

(c) Parasitic gastritis and other parasitic diseases of cattle and sheep.

(d) Liver Fluke disease in cattle and sheep.

(e) Black Quarter vaccination.

(f) Braxy and other diseases of sheep.

(g) Necrotic Enteritis and other diseases of swine.

(h) Other investigations are undertaken in connection with mortalities of farm stock of obscure origin.

VETERINARY COLLEGE OF IRELAND.

STAFF FOR VETERINARY RESEARCH.

1. J. F. Craig, M.A., M.R.C.V.S., Principal.
2. W. Kearney, M.R.C.V.S., Prof. of Pathology and Bacteriology.

The College is situated at Ballsbridge about two miles from the General Post Office, Dublin, and beside numerous Bus and Tram services. Telephone, Ballsbridge 63.

The amount of Research which is carried on at the College is limited owing to the small size of the Staff and the time which has to be devoted to teaching and other duties.

SUMMARY OF WORK.

The work may be divided into two sections (a) routine diagnosis and (b) investigations.

(a) Routine diagnosis occupies the major portion of the time available. It comprises—

1. Diagnosis of specimens forwarded by Veterinary Practitioners including tests for contagious abortion.
2. Diagnosis of diseases of poultry—post mortem examination of dead poultry sent from the field—microscopical and cultural examination of chicks and other birds—agglutination tests for Bacillary White Diarrhoea.

(b) Research work has been carried out on—

1. Control of Contagious abortion—improvement in methods.
2. Bovine mastitis.
3. Diseases caused by poisonous plants—Ragwort, Blacken.
4. Chronic Haematuria of Cattle.
5. Poultry diseases, improvements in diagnosis and control of Fowl Typhoid and Bacillary White Diarrhoea, Blackhead.
6. Sterility in mares and cattle.

FACILITIES FOR STUDY AND RESEARCH.

The College has a well equipped bacteriological laboratory and has a considerable amount of accommodation for laboratory animals and also accommodation to a limited extent for horses, cattle, sheep and poultry. Ample material is also at hand for study and research into diseases of cattle and poultry, or can be readily obtained.

Visiting workers could be accommodated.

BUTTER TESTING STATION.

The Butter Testing Station is situated at Harcourt Terrace, Dublin, a few minutes' walk from the nearest point on several of the city tramway and omnibus routes in a residential district free from industrial activities.

STAFF.

<i>Officer in Charge</i>	... A. Poole Wilson, Senior Inspector, Department of Agriculture.
<i>Official Analyst</i>	... P. S. Arup, M.Sc., F.I.C.
<i>Assistant Chemist</i>	... Miss M. MacNeill, M.Sc., A.I.C., A.R.C.Sc.I.
<i>Bacteriologist</i>	... G. Van Barneveld Gilmour, B.Sc. (London), Ph.D. (London), A.R.C.Sc.I., F.I.C.
<i>Assistant Bacteriologist</i>	G. C. Cruess-Callaghan, M.Sc., A.I.C., A.R.C.Sc.I.

The Butter Testing Station comprises a large hall, fitted with cold air circulation, enabling considerable numbers of packages of butter to be examined commercially for flavour, texture,

packing, etc., at the one time, under suitable conditions at all seasons ; two cold stores, with pre-cooling passages, for the storage of butter for a period in order to determine the changes taking place during storage ; chemical and bacteriological laboratories, and office accommodation. The refrigerating machinery is ample for all the requirements of the Station and affords, at the same time, an example of equipment of this character suitable for a large creamery. The chemical and bacteriological laboratories are very fully equipped, on the most modern lines, for examination of samples on a large scale, and should meet all possible requirements of the dairying industry of the country.

SUMMARY OF WORK.

Mainly in view of the requirements of the Dairy Produce Act, 1924, analysis of samples of butter, cream, salt, parchment paper, colouring matter, water supplies to creameries, etc., is being constantly carried on. Investigations are made into the chemical constitution of butter fats, Reichert-Meissl, Polenske, Kirschner, etc., figures of butters being determined at the different seasons of the year. Observations and experiments are carried on in connection with the texture and body of butter, the keeping quality of cream without preservatives, the bacteriological contents of water supplies and of milk, cream and butter at various stages of treatment at creameries, and any difficulty of manufacture that may arise at a creamery is investigated, with a view to ascertaining the cause and indicating a remedy.

Butter sent to the Station for surprise butter inspections throughout the year is examined for the presence of bacteria, yeasts and moulds, with a view to the elimination of taints, and with the ultimate object of fixing bacteriological standards for butter.

Investigations have been carried out in regard to the variations in the composition of Irish butter as disclosed by Reichert-Meissl and other tests, and in regard to the distribution of volatile acids in butter fat.

II.

UNIVERSITY PROFESSORS
IN SCIENCES COGNATE TO
AGRICULTURE.

BACTERIOLOGY.

DUBLIN UNIVERSITY, Trinity College	J. W. Bigger, M.D., Sc.D.
NATIONAL UNIVERSITY OF IRELAND,	
University College, Dublin. ...	T. T. O'Farrell, F.R.C.S.I., D.P.H., D.Sc.
University College, Cork ...	A. E. Moore, M.B., B.Ch., B.A.O.
University College, Galway ...	T. Walsh, M.A., M.D., B.Sc., B.Ch., B.A.O., D.P.H.
Conjoint Royal College of Physicians and Royal College of Surgeons, Dublin.	W. Boxwell, F.R.C.P.I.
Veterinary College of Ireland, Dublin ...	W. Kearney, M.R.C.V.S.

BOTANY.

DUBLIN UNIVERSITY, Trinity College ...	H. H. Dixon, Sc.D., F.R.S.
NATIONAL UNIVERSITY OF IRELAND.	
University College, Dublin. ...	J. Doyle, B.A., D.Sc.
University College, Cork ...	H. A. Cummins, M.D., D.P.H., F.L.S.
Conjoint Royal College of Physicians and Royal College of Surgeons, Dublin.	R. F. J. Henry, F.R.C.S.I.
University College, Galway ...	T. J. Dinan, M.Sc. H.Dip. in Ed.

ZOOLOGY.

DUBLIN UNIVERSITY, Trinity College	J. B. Gatenby, M.A., D.Sc., D.Phil.
NATIONAL UNIVERSITY OF IRELAND.	
University College, Dublin. ...	J. B. Butler, M.A., M.B., B.Ch., B.A.O.
University College, Cork ...	L. P. W. Renouf, B.A., Dip. Agric.
Conjoint Royal College of Physicians and Royal College of Surgeons, Dublin.	R. F. J. Henry, F.R.C.S.I.

PHYSIOLOGY.

DUBLIN UNIVERSITY, Trinity College ...	H. Pringle, M.D.
NATIONAL UNIVERSITY OF IRELAND.	
University College, Dublin. ...	J. M. O'Connor, M.D.
University College, Cork ...	D. T. Barry, M.D., D.Sc., F.R.C.S., D.Ph.
University College, Galway ...	J. F. Donegan, B.Sc., M.B., B.Ch., B.A.O.
Conjoint Royal College of Physicians and Royal College of Surgeons, Dublin.	W. J. E. Jessop, M.D.
Veterinary College of Ireland, Dublin	J. Stafford Johnson, M.B.

ANATOMY.

DUBLIN UNIVERSITY, Trinity College	A. F. Dixon, M.B., Sc.D.
NATIONAL UNIVERSITY OF IRELAND.	
University College, Dublin. ...	E. P. McLoughlin, B.A., M.B., B.Ch., B.A.O.
University College, Cork ...	D. P. Fitzgerald, B.A., M.B., B.Ch. B.A.O.
University College, Galway ...	S. Shea, M.B., B.Ch., B.A.O.
Conjoint Royal College of Physicians and Royal College of Surgeons, Dublin.	E. J. Evatt, D.S.O., M.B., B.S.
Veterinary College of Ireland, Dublin	T. G. Browne, M.R.C.V.S.

PATHOLOGY.

DUBLIN UNIVERSITY, Trinity College	J. T. Wigham, M.D.
NATIONAL UNIVERSITY OF IRELAND.	
University College, Dublin ...	T. T. O'Farrell, F.R.C.S.I., D.P.H., D.Sc.
University College, Cork ...	A. E. Moore, M.B., B.Ch., B.A.O.
University College, Galway ...	T. Walsh, M.A., M.D., B.Sc., B.Ch., B.A.O., D.P.H.
Conjoint Royal College of Physicians and Royal College of Surgeons, Dublin.	W. Boxwell, F.R.C.P.I., M.B., B.S.
Veterinary College of Ireland, Dublin	W. Kearney, M.R.C.V.S.

CHEMISTRY.

DUBLIN UNIVERSITY, Trinity College	E. A. Werner, M.A., Sc.D.
NATIONAL UNIVERSITY OF IRELAND.	
University College, Dublin ...	H. Ryan, M.A., D.Sc.
University College, Cork ...	J. Reilly, M.A., D.Sc., F.I.C., F.R.C.Sc.I.
University College, Galway ...	T. Dillon, M.A., D.Sc.
Conjoint Royal College of Physicians and Royal College of Surgeons, Dublin.	W. J. E. Jessop, M.D.

PHYSICS.

DUBLIN UNIVERSITY, Trinity College	T. G. Moorhead, M.D.
NATIONAL UNIVERSITY OF IRELAND.	
University College, Dublin ...	J. J. Nolan, M.A., D.Sc.
University College, Cork ...	W. Bergin, M.A.
University College, Galway ...	A. Anderson, M.A., L.L.D., D.Sc.
Conjoint Royal College of Physicians and Royal College of Surgeons, Dublin.	W. J. E. Jessop, M.D.

NATURAL PHILOSOPHY.

DUBLIN UNIVERSITY, Trinity College	J. L. Synge, M.A., Sc.D.
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CIVIL ENGINEERING.

DUBLIN UNIVERSITY, Trinity College	D. Clark, M.A., B.Sc., M.I.C.E., M.I.C.E.I., M.Am.Soc.C.E.
NATIONAL UNIVERSITY OF IRELAND.	
University College, Dublin ...	P. F. Purcell, M.A., M.A.I., A.M.I.C.E.
University College, Cork ...	H. N. Walsh, M.E., D.I.C., M.I.C.E.I.
University College, Galway ...	F. S. Rishworth, B.A., B.E., A.M.I.C.E.

ELECTRICAL ENGINEERING.

NATIONAL UNIVERSITY OF IRELAND :	
University College, Dublin ...	F. E. W. Hackett, M.A., M.Sc., Ph.D.
University College, Galway ...	W. G. Griffith, B.Sc., A.M.I.E.E.

MECHANICAL ENGINEERING.

NATIONAL UNIVERSITY OF IRELAND.	
University College, Dublin ...	J. Taylor, M.A., A.R.C.Sc.I.

GEOLOGY.

DUBLIN UNIVERSITY, Trinity College J. Joly, M.A., B.A.I., Sc.D., F.R.S.,
F.T.C.D.

NATIONAL UNIVERSITY OF IRELAND.

University College, Dublin	...	H. J. Seymour, B.A., B.Sc., F.G.S.
University College, Cork ...	...	I. Swain, B.A., A.R.C.S.I.
University College, Galway	...	J. Mitchell, B.Sc., B.E., F.G.S.

ECONOMICS.

DUBLIN UNIVERSITY, Trinity College C. F. Bastable, M.A., LL.D., F.B.A.

NATIONAL UNIVERSITY OF IRELAND.

University College, Dublin	...	G. O'Brien, D.Litt., B.L.	{ <i>Political</i> <i>Economy.</i> <i>National</i> <i>Economics.</i>
University College, Cork ...	...	J. Busteed, M.Comm., F.S.S.
University College, Galway	...	F. McBryan, M.A.	

ACCOUNTANCY.

NATIONAL UNIVERSITY OF IRELAND.

University College, Cork ...	...	A. J. Magennis, M.Econ.Sc., F.S.A.A.
University College, Galway	...	F. McBryan, M.A.

GEOGRAPHY.

NATIONAL UNIVERSITY OF IRELAND.

University College, Cork ...	...	I. Swain, B.A., M.R.I.A.
University College, Galway	...	J. Mitchell, B.Sc., B.E., F.G.S.

III.

PROFESSORS, READERS AND LECTURERS IN
AGRICULTURAL SCIENCE AND COGNATE PURE
SCIENCES AT UNIVERSITIES AT WHICH RE-
SEARCH AND TEACHING IN AGRICULTURE IS
CARRIED OUT.

TRINITY COLLEGE, DUBLIN.

Registrar (School of Agriculture): J. Joly, Sc.D., M.A., B.A.I., F.R.S., F.T.C.D.

ANATOMY.—*Professor*: A. F. Dixon, M.B., Sc.D. One Lecturer.

BIO-CHEMISTRY.—One Lecturer.

BOTANY.—*Professor*: H. H. Dixon, Sc.D.

CHEMISTRY.—*Professor*: E. A. Werner, M.A., Sc.D.

POLITICAL ECONOMY.—*Professor*: C. F. Bastable, LL.D. One Lecturer.

ENGINEERING.—*Professors*: D. Clark M.A., B.Sc., Sir John P. Griffith, M.A.I. (Honorary) (Harbour Engineering).

Lecturers: W. Tatlow, M.A., B.A.I. (Electrical); G.M. Harris, M.A. (Electric Traction); J. R. Cotter, M.A.

GEOLOGY.—*Professor*: J. Joly, M.A., Sc.D.

NATURAL PHILOSOPHY.—*Professors*: J. L. Synge, M.A., Sc.D., W. E. Thrift, M.A. F.T.C.D.

PATHOLOGY AND BACTERIOLOGY.—*Professors*: J. T. Wigham, M.D., J. W. Bigger M.D., Sc.D.

PHYSICS.—*Professor*: T. G. Moorhead, M.D. One Lecturer.

PHYSIOLOGY.—*Professor*: H. Pringle, M.D.

ZOOLOGY.—*Professor*: J. B. Gatenby, M.A., Ph.D.

NATIONAL UNIVERSITY OF IRELAND.

UNIVERSITY COLLEGE, DUBLIN.

Registrar: A. W. Conway, M.A., D.Sc., F.R.S.

The following agricultural research institute is connected with the University: Albert Agricultural College, Glasnevin.

AGRICULTURE.—*Professors*: J. P. Drew, M.Sc., A.R.C.Sc.I. (*General Agriculture*); P. A. Murphy, B.A., Sc.D., A.R.C.Sc.I. (*Plant Pathology*); G. O'Brien, D.Litt. (*Agricultural Economics*); J. Taylor, M.A., A.R.C.Sc.I. (*Agricultural Engineering*); H. Seymour, B.A., B.Sc., F.G.S. (*Agricultural Geology*). *Lecturers*: G. Stephenson (*Agricultural Chemistry*); M. J. Gorman, A.R.C.Sc.I. (*Agricultural Botany and Bacteriology*); E. J. Sheehy, B.Sc., F.R.C.Sc.I. (*Animal Nutrition*); M. Caffrey, A.R.C.Sc.I. (*Plant Breeding*); G. O. Sherrard, A.R.C.Sc.I. (*Horticulture*); J. Carroll, M.Sc., D.I.C., N.D.A., A.R.C.Sc.I. (*Agricultural Zoology*); F. C. Mason, M.R.C.V.S. (*Veterinary Hygiene*).

ANATOMY.—*Professor*: E. P. McLoughlin, B.A., M.B., B.Ch., B.A.O.

BOTANY.—*Professor*: J. Doyle, B.A., D.Sc.

CHEMISTRY.—*Professor*: H. Ryan, M.A., D.Sc. Three Lecturers (one in Organic, one in Physical).

ECONOMICS AND POLITICAL ECONOMY.—*Professor*: G. O'Brien, D.Litt.

ENGINEERING.—*Professors*: P. F. Purcell, M.A., M.A.I., A.M.I.C.E.; J. Taylor, M.A., A.R.C.Sc.I. (*Mechanical*). *Lecturers*: R. G. Allen, B.Sc., A.R.C.Sc.I., M.I.E.E. (*Electro-Technology*); F. W. Warwick, B.A., B.E., A.R.C.Sc.I. (*Mechanical*).

GEOLOGY.—*Professor*: H. J. Seymour, B.A., B.Sc., F.G.S.

PATHOLOGY AND BACTERIOLOGY.—*Professor*: T. T. O'Farrell, F.R.C.S.I., D.P.H. One Lecturer.

PHYSICS.—*Professors*: A. W. Conway, M.A., D.Sc., F.R.S.; J. J. Nolan, M.A., D.Sc. (*Experimental*). One Lecturer.

PHYSIOLOGY.—*Professor*.—J. M. O'Connor, B.A., M.D. Two Lecturers.

ZOOLOGY.—*Professor*: J. B. Butler, M.A., M.B., B.Ch., B.A.O.

UNIVERSITY COLLEGE, CORK.

Registrar : A. O'Rahilly, M.A., B.Sc., Ph.D.

AGRICULTURE.—*Professor* : C. Boyle, M.A., B.Sc., Ph.D., D.I.C. (*Agriculture*).
Lecturers : M. Grimes, M.Sc., Ph.D. (*Dairy Bacteriology*) ; G. T. Pyne, M.Sc.,
 Ph.D., A.R.C.Sc.I., F.I.C. (*Dairy Chemistry*) ; L. Lyons, A.R.C.Sc.I., N.D.A.,
 N.D.D. (*Dairy Technology*) ; F. A. McGrath, B.E., A.M.I.E.E., A.M.I.C.E.I.
 (*Dairy Engineering*) ; M. Murphy, M.A., B.Comm. (*Dairy Accountancy and
 Economics*).

ANATOMY.—*Professor* : D. P. Fitzgerald, B.A., M.B., B.Ch., B.A.O.

BOTANY.—*Professor* : H. A. Cummins, M.D., D.P.H., F.L.S.

CHEMISTRY.—*Professor* : J. Reilly, M.A., D.Sc., F.I.S., F.R.C.Sc.I. One Lecturer.

ECONOMICS.—*Professor* ; J. Busteed, M.Comm., F.S.S.

ENGINEERING.—*Professor* : H. N. Walsh, M.E., D.I.C., M.I.C.E.I. *Lecturers* :
 S. W. Farrington, B.A., B.E., F. McGrath, B.E. (*Electrical*).

GEOGRAPHY.—*Professor* : I. Swain, B.A., M.R.I.A.

GEOLOGY.—*Professor* : I. Swain, B.A., M.R.I.A.

PATHOLOGY.—*Professor* : A. E. Moore, M.B., B.Ch., B.A.O.

PHYSICS.—*Professors* : W. Bergin, M.A. (*Experimental*) ; A. O'Reilly, M.A.,
 B.Sc., Ph.D. One Lecturer.

PHYSIOLOGY.—*Professor* : D. T. Barry, M.D., D.Sc., F.R.C.S., D.P.H.

ZOOLOGY.—*Professor* : L. P. W. Renouf, B.A., Dip. Agr.

UNIVERSITY COLLEGE, GALWAY.

ANATOMY.—*Professor* : S. Shea, M.B., B.Ch., B.A.O.

CHEMISTRY.—*Professor* : T. Dillon, M.A., D.Sc.

ECONOMICS.—*Professor* : F. McBryan, M.A., H. Dip. in Ed.

ENGINEERING.—*Professors* : F. S. Rishworth, B.A., B.E., A.M.I.C.E. ; Wm. G.
 Griffith, B.Sc., A.M.I.C.E. (*Electrical*).

GEOGRAPHY.—*Professor* : J. Mitchell, B.Sc., B.E., F.G.S.

GEOLOGY.—*Professor* : J. Mitchell, B.Sc., B.E., F.G.S.

PATHOLOGY.—*Professor* : T. Walsh, M.A., M.D., B.Sc., B.Ch., B.A.O., D.P.H.,
 H. Dip. in Ed.

PHYSICS.—*Professor* : A. Anderson, M.A., (Hon.) D.Sc.

PHYSIOLOGY.—*Professor* : J. F. Donegan, B.Sc., M.B., B.Ch., B.A.O.

BOTANY.—*Professor* : T. J. Dinan, M.Sc., H. Dip. in Ed.

